

October 12, 2001

Mr. Roy Ahrndt  
Cardinal IG  
301 East McSwain Drive  
Fremont, IN 46737

Re: Registered Operation Status,  
151-14740-00056

Dear Mr. Ahrndt:

The application from Cardinal IG received on August 2, 2001, has been reviewed. Based on the data submitted and the provisions in 326 IAC 2-5.5, it has been determined that the following commercial and residential sealed window fabrication facility located at 301 East McSwain Drive, Indiana, is classified as registered:

- (a) Fifteen (15) natural gas-fired space heating and air conditioning York units, identified as FC-6 through FC-20, with a combined maximum heat input capacity of 2.29 million Btu per hour. These units vent internally.
- (b) One (1) natural gas-fired tempering oven, identified as OVN-1, with a maximum heat input capacity of 8 million Btu per hour. This unit vents to the atmosphere via stack OVN-1.
- (c) Three (3) natural gas-fired thermocyclers, identified as FC-1 through FC-3, with a combined maximum heat input capacity of 0.96 million Btu per hour. These units vent to the atmosphere via stacks FC-01, FC-02, and FC-03.
- (d) Two (2) natural gas-fired Reznor space heaters, identified as FC-4 and FC-5, with a combined maximum heat input capacity of 0.15 million Btu per hour. These stacks vent to the atmosphere via stacks FC-04 and FC-05.
- (e) One (1) touch-up paint booth consisting of a manual Mutins cleaning step using isopropyl alcohol prior to touch-up. This unit is identified as PB-1 and it has a maximum capacity of 200 units per hour. This unit exhaust inside, with a roof exhaust vent directly above the booth.

The following conditions shall be applicable:

Pursuant to 326 IAC 5-1-2 (Opacity Limitations) except as provided in 326 IAC 5-1-3 (Temporary Alternative Opacity Limitations), opacity shall meet the following:

- (a) Opacity shall not exceed an average of forty percent (40%) in any one (1) six (6) minute averaging period as determined in 326 IAC 5-1-4.
- (b) Opacity shall not exceed sixty percent (60%) for more than a cumulative total of 15 minutes (60 readings) in a 6-hour period as measured according to 40 CFR 60, Appendix A, Method 9 or fifteen (15) one (1) minute nonoverlapping integrated averages for a continuous opacity monitor in a six (6) hour period.

Pursuant to 326 IAC 6-3-2 (Particulate Emission Limitations)

The particulate matter (PM) from the paint booth PB-1 shall not exceed the pound per hour emission rate established as E in the following formula:

Interpolation of the data for the process weight rate up to sixty thousand (60,000) pounds per hour shall be accomplished by use of the equation:

$$E = 4.10 P^{0.67} \quad \text{where } E = \text{rate of emission in pounds per hour; and} \\ P = \text{process weight rate in tons per hour}$$

The dry filter shall be in operation at all times the paint booth is in operation, in order to comply with this limit.

The Permittee shall maintain records in accordance with (a) through (c) below. Records maintained for (a) through (c) shall be taken monthly and shall be complete and sufficient to establish compliance with the Registration status.

- (a) The amount of volatile organic compounds (VOC) and hazardous air pollutants (HAPs) content of each coating material and solvent used. Records shall include purchase orders, invoices, and material safety sheets (MSDS) necessary to verify the type and amount used. Solvent usage records shall differentiate between those added to coatings and those used as cleanup solvents;
- (b) The cleanup solvent usage for each month; and
- (c) The total VOC and HAP usage for each month.

Any change or modification which may increase the potential emissions to 25 tons per year or more of volatile organic compounds must be approved by the Office of Air Quality before any such change may occur. Additionally, any change or modification which may increase the potential emissions of a single HAP to greater than 10 tons per year or a combination of HAPs to greater than 25 tons per year must be approved by OAQ before such change may occur.

This registration is the first air approval issued to this source. The source may operate according to 326 IAC 2-5.5.

An authorized individual shall provide an annual notice to the Office of Air Quality that the source is in operation and in compliance with this registration pursuant to 326 IAC 2-5.5-4(a)(3). The annual notice shall be submitted to:

Compliance Branch  
Office of Air Quality  
100 North Senate Avenue  
P.O. Box 6015  
Indianapolis, IN 46206-6015

no later than March 1 of each year, with the annual notice being submitted in the format attached.

An application or notification shall be submitted in accordance with 326 IAC 2 to the Office of Air Quality (OAQ) if the source proposes to construct new emission units, modify existing emission units, or otherwise modify the source.

Sincerely,

Original signed by Paul Dubenetzky

Paul Dubenetzky, Chief  
Permits Branch  
Office of Air Quality

ERG/AR

cc: File - Steuben County  
Steuben County Health Department  
Air Compliance -Doyle Houser  
Northern Regional Office  
Permit Tracking - Cynthia ByMaster  
Technical Support and Modeling - Michele Boner  
Compliance Branch - Karen Nowak  
Office of Enforcement

## Registration Annual Notification

This form should be used to comply with the notification requirements under *326 IAC 2-5.5-4(a)(3)*

<b>Company Name:</b>	Cardinal IG
<b>Address:</b>	301 East McSwain Drive
<b>City:</b>	Fremont, IN 46737
<b>Authorized individual:</b>	Roy Ahrndt
<b>Phone #:</b>	219-495-4105
<b>Registration #:</b>	151-14740-00056

I hereby certify that Cardinal IG is still in operation and is in compliance with the requirements of Registration 151-14740-00056.

<b>Name (typed):</b>
<b>Title:</b>
<b>Signature:</b>
<b>Date:</b>

## **Indiana Department of Environmental Management Office of Air Quality**

### **Technical Support Document (TSD) for a Registration**

#### **Source Background and Description**

**Source Name:** Cardinal IG  
**Source Location:** 301 East McSwain Drive, Fremont, IN 46737  
**County:** Steuben  
**SIC Code:** 3231  
**Operation Permit No.:** 151-14740-00056  
**Permit Reviewer:** ERG/AR

The Office of Air Quality (OAQ) has reviewed an application from Cardinal IG relating to the operation of a commercial and residential sealed window fabrication facility.

#### **Permitted Emission Units and Pollution Control Equipment**

There are no permitted facilities operating at this source during this review process. This is the source's first permit.

#### **Unpermitted Emission Units and Pollution Control Equipment**

- (a) Fifteen (15) natural gas-fired space heating and air conditioning York units, identified as FC-6 through FC-20, with a combined maximum heat input capacity of 2.29 million Btu per hour. These units vent internally.
- (b) One (1) natural gas-fired tempering oven, identified as OVN-1, with a maximum heat input capacity of 8 million Btu per hour. This unit vents to the atmosphere via stack OVN-1.
- (c) Three (3) natural gas-fired thermocyclers, identified as FC-1 through FC-3, with a combined maximum heat input capacity of 0.96 million Btu per hour. These units vent to the atmosphere via stacks FC-01, FC-02, and FC-03.
- (d) Two (2) natural gas-fired Reznor space heaters, identified as FC-4 and FC-5, with a combined maximum heat input capacity of 0.15 million Btu per hour. These stacks vent to the atmosphere via stacks FC-04 and FC-05.
- (e) One (1) touch-up paint booth consisting of a manual Mutins cleaning step using isopropyl alcohol prior to touch-up. This unit is identified as PB-1 and it has a maximum capacity of 200 units per hour. This unit exhaust inside, with a roof exhaust vent directly above the booth.

#### **New Emission Units and Pollution Control Equipment Receiving Prior Approval**

There are no new construction activities included in this permit.

### Existing Approvals

There are no existing approvals for this source.

### Enforcement Issue

- (a) IDEM is aware that equipment has been constructed and operated prior to receipt of the proper permit. The subject equipment is listed in this Technical Support Document under the condition entitled Unpermitted Emission Units and Pollution Control Equipment.
- (b) IDEM is reviewing this matter and will take appropriate action. This proposed permit is intended to satisfy the requirements of the construction permit rules.

### Stack Summary

Stack ID	Operation	Height (feet)	Diameter (feet)	Flow Rate (acfm)	Temperature (°F)
OVN-1	COMBUSTION STACK for tempering oven	28	3	700	400E
PB-1	Paint Booth (INSIDE EXHAUST but roof vent located immediately above it.) The roof vent is closed off in winter.	24	2	1,400	75
FC-01, 02, 03	Space Heat - Thermocyclers	26	.75	90	340
FC-04, 05	Space Heat - Reznor	26	.25	25	170
FC-6 - FC-12	Space Heat - York Temperature Control for Heating the Mezzanine	No Stack			
FC-13-20	Space Heat - York Non-production Space	No Stack			
EV-1 to EV-13	Exhaust Vents (One directly above paint booth exhaust is exhausted 365 days per year.)	26	24	7,000	72

### Recommendation

The staff recommends to the Commissioner that the operation be approved. This recommendation is based on the following facts and conditions:

Unless otherwise stated, information used in this review was derived from the application and additional information submitted by the applicant.

A complete application for the purposes of this review was received on August 2, 2001.

### Emission Calculations

See Appendix A of this document for detailed emissions calculations (pages 1 through 10).

### Potential To Emit of Source Before Controls

Pursuant to 326 IAC 2-1.1-1(16), Potential to Emit is defined as "the maximum capacity of a stationary source or emissions unit to emit any air pollutant under its physical and operational design. Any physical or operational limitation on the capacity of a source to emit an air pollutant, including air pollution control equipment and restrictions on hours of operation or type or amount of material combusted, stored, or processed shall be treated as part of its design if the limitation is enforceable by the U. S. EPA, the department, or the appropriate local air pollution control agency."

Pollutant	Potential To Emit (tons/year)
PM	2.87
PM-10	2.87
SO <sub>2</sub>	0.03
VOC	24.28
CO	4.19
NO <sub>x</sub>	4.99

HAP's	Potential To Emit (tons/year)
Hexane	0.09
TOTAL	0.09

- (a) The potential to emit (as defined in 326 IAC 2-7-1(29)) of criteria pollutants is less than 100 tons per year. Therefore, the source is not subject to the provisions of 326 IAC 2-7.
- (b) The potential to emit (as defined in 326 IAC 2-7-1(29)) of criteria pollutants is less than 25 tons per year. Therefore, the source is not subject to the provisions of 326 IAC 2-6.1.
- (c) The potential to emit (as defined in 326 IAC 2-7-1(29)) of pollutants are greater than levels listed in 326 IAC 2-1.1-3(d)(1), therefore the source is subject to the provisions of 326 IAC 2-5.5.1.
- (d) The potential to emit (as defined in 326 IAC 2-7-1(29)) of any single HAP is less than ten (10) tons per year and/or the potential to emit (as defined in 326 IAC 2-7-1(29)) of a combination of HAPs is less than twenty-five (25) tons per year. Therefore, the source is not subject to the provisions of 326 IAC 2-7.
- (e) This type of operation is not one of the twenty-eight (28) listed source categories under 326 IAC 2-2 and since there are no applicable New Source Performance Standards that were in effect on August 7, 1980, the fugitive particulate matter (PM) and volatile organic compound (VOC) emissions are not counted toward determination of PSD and Emission Offset applicability.

### County Attainment Status

The source is located in Steuben County.

Pollutant	Status
PM-10	Attainment
SO <sub>2</sub>	Attainment
NO <sub>2</sub>	Attainment
Ozone	Attainment
CO	Attainment
Lead	Attainment

- (a) Volatile organic compounds (VOC) and oxides of nitrogen (NO<sub>x</sub>) are precursors for the formation of ozone. Therefore, VOC emissions are considered when evaluating the rule applicability relating to the ozone standards. Steuben County has been designated as attainment or unclassifiable for ozone. Therefore, VOC and NO<sub>x</sub> emissions were reviewed pursuant to the requirements for Prevention of Significant Deterioration (PSD), 326 IAC 2-2 and 40 CFR 52.21.

- (b) Steuben County has been classified as attainment or unclassifiable for all other criteria pollutants. Therefore, these emissions were reviewed pursuant to the requirements for Prevention of Significant Deterioration (PSD), 326 IAC 2-2 and 40 CFR 52.21.

### **Part 70 Permit Determination**

#### **326 IAC 2-7 (Part 70 Permit Program)**

This existing source is not subject to the Part 70 Permit requirements because the potential to emit (PTE) of:

- (a) each criteria pollutant is less than 100 tons per year,
- (b) a single hazardous air pollutant (HAP) is less than 10 tons per year, and
- (c) any combination of HAPs is less than 25 tons/year.

This is the first air approval issued to this source.

### **Federal Rule Applicability**

- (a) This source is not subject to the requirements of the New Source Performance Standard, 326 IAC 12, (40 CFR 60, Subpart CC), because they do not manufacture glass, they make windows using sheet glass.
- (b) This source is not subject to the requirements of the New Source Performance Standard, 326 IAC 12, (40 CFR 60, Subpart EE), because they do not surface coat metal furniture, they touch up the painted surfaces of windows marred during the cutting or assembly.
- (c) There are no National Emission Standards for Hazardous Air Pollutants (NESHAPs) (326 IAC 14 and 40 CFR Part 63) applicable to this source.

### **State Rule Applicability - Entire Source**

#### **326 IAC 2-6 (Emission Reporting)**

This source is located in Steuben County and the potential to emit all criteria pollutants is less than one hundred (100) tons per year. Therefore, 326 IAC 2-6 does not apply.

#### **326 IAC 5-1 (Visible Emissions Limitations)**

Pursuant to 326 IAC 5-1-2 (Opacity Limitations), except as provided in 326 IAC 5-1-3 (Temporary Alternative Opacity Limitations), opacity shall meet the following, unless otherwise stated in this permit:

- (a) Opacity shall not exceed an average of forty percent (40%) any one (1) six (6) minute averaging period as determined in 326 IAC 5-1-4.
- (b) Opacity shall not exceed sixty percent (60%) for more than a cumulative total of fifteen (15) minutes (sixty (60) readings) as measured according to 40 CFR 60, Appendix A, Method 9 or fifteen (15) one (1) minute nonoverlapping integrated averages for a continuous opacity monitor) in a six (6) hour period.

### **State Rule Applicability - Individual Facilities**

#### **326 IAC 2-4.1 (Major Sources of Hazardous Air Pollutants (HAP))**

The commercial and residential sealed window fabrication facility will emit less than 10 tons per year of a single HAP or 25 tons per year of a combination of HAPs. Therefore, 326 IAC 2-4.1 does not apply.

**326 IAC 8-1-6 (New Facilities - General Reduction Requirement)**

This source does not have potential VOC emissions equal to or greater than twenty five (25) tons per year, therefore this source is not subject to the provisions of 326 IAC 8-1-6.

**326 IAC 6-3 (Process Operations)**

The particulate emissions for the space heaters, tempering oven, and thermocyclers are only coming from the combustion of natural gas therefore, 326 IAC 6-3 does not apply to these units.

**326 IAC 6-3-2 (Particulate Emission Limitations)**

The particulate matter (PM) from the paint booth PB-1 shall not exceed the pound per hour emission rate established as E in the following formula:

Interpolation of the data for the process weight rate up to sixty thousand (60,000) pounds per hour shall be accomplished by use of the equation:

$$E = 4.10 P^{0.67}$$

where E = rate of emission in pounds per hour; and  
P = process weight rate in tons per hour

The dry filter shall be in operation at all times the paint booth is in operation, in order to comply with this limit.

**326 IAC 8-2-9 (Miscellaneous Metal Coating)**

This source does not surface coat farm machinery, small household appliances, office equipment, industrial machinery, and its Standard Industrial Classification Code is not in groups # 33, 34, 35, 36, 37, 38, and 39. This source only touches up window surfaces that may have been marred during cutting or assembly. This source also does not perform any of the following operation commencing July 1, 1991: Maintenance coating of production equipment, application of adhesives or preparation of adhesives, applying lubricants used to prevent sticking of internally moving parts, and preparing chromium plated plastics. Therefore, 326 IAC 8-2-9 does not apply.

**Conclusion**

The operation of this commercial and residential sealed window fabrication facility shall be subject to the conditions of the attached Registration 151-14740-00056.

**Appendix A: Emission Calculations**  
**Natural Gas Combustion Only**  
**MMBTU/HR<100**  
**Thermocyclers**

**Company Name:** Cardinal IG  
**Address City IN Zip:** 301 East McSwain Drive, Fremont, IN 46737  
**CP:** 151-14740  
**Plt ID:** 151-00056  
**Reviewer:** ERG/AR  
**Date:** 4-Sep-01

Heat Input Capacity  
MMBTu/hr

Potential Throughput  
MMCF/yr

1.0

8.4

Pollutant						
Emission Factor in lb/MMCF	PM* 7.6	PM10* 7.6	SO2 0.6	NO <sub>x</sub> 100.0 **see below	VOC 5.5	CO 84.0
Potential Emission in tons/yr	0.0	0.0	0.0	0.4	0.0	0.4

\*PM emission factor is filterable PM only. PM10 emission factor is condensable and filterable PM10 combined.

\*\*Emission Factors for NO<sub>x</sub>: Uncontrolled = 100, Low NO<sub>x</sub> Burner = 50, Low NO<sub>x</sub> Burners/Flue gas recirculation = 32

**Methodology**

All Emission factors are based on normal firing.

MMBTu = 1,000,000 Btu

MMCF - 1,000,000 Cubic Feet of Gas

Potential Throughput (MMCF) = Heat Input Capacity (MMBTu/hr) x 8,760 hrs/yr x 1 MMCF/1,000 MMBtu

Emission Factors from AP-42, Chapter 1.4, Tables 1.4-1, 1.4-2, and 1.4-3, SCC #1-02-006-02, 1-01-006-02, 1-03-006-02, and 1-03-006-03

(AP-42 Supplement D 3/98)

Emission (tons/yr) = Throughput (MMCF/yr) x Emission Factor (lb/MMCF)/2,000 lb/ton

See next page for HAPs emissions calculations.

**Appendix A: Emission Calculations**  
**Natural Gas Combustion Only**  
**MMBTU/HR<100**  
**Thermocyclers**

**Company Name:** Cardinal IG  
**Address City IN Zip:** 301 East McSwain Drive, Fremont, IN 46737  
**CP:** 151-14740  
**Plt ID:** 151-00056  
**Reviewer:** ERG/AR  
**Date:** 4-Sep-01

**HAPs - Organics**

Emission Factor in lb/MMCF	Benzene 2.1E-03	Dichlorobenzene 1.2E-03	Formaldehyde 7.5E-02	Hexane 1.8E+00	Toluene 3.4E-03
Potential Emission in tons/yr	8.830E-06	5.046E-06	3.154E-04	7.569E-03	1.430E-05

**HAPs - Metals**

Emission Factor in lb/MMCF	Lead 5.0E-04	Cadmium 1.1E-03	Chromium 1.4E-03	Manganese 3.8E-04	Nickel 2.1E-03
Potential Emission in tons/yr	2.102E-06	4.625E-06	5.887E-06	1.598E-06	8.830E-06

Total HAPs = 7.935E-03 tons/yr

Methodology is the same as previous page.

The five highest organic and metal HAPs emission factors are provided above.  
 Additional HAPs emission factors are available in AP-42, Chapter 1.4.

**Appendix A: Emission Calculations**  
**Natural Gas Combustion Only**  
**MMBTU/HR<100**  
**Reznor**

**Company Name:** Cardinal IG  
**Address City IN Zip:** 301 East McSwain Drive, Fremont, IN 46737  
**CP:** 151-14740  
**Pit ID:** 151-00056  
**Reviewer:** ERG/AR  
**Date:** 4-Sep-01

Heat Input Capacity  
MMBTu/hr

Potential Throughput  
MMCF/yr

0.2

1.3

Pollutant						
	PM*	PM10*	SO2	NO <sub>x</sub>	VOC	CO
Emission Factor in lb/MMCF	7.6	7.6	0.6	100.0 **see below	5.5	84.0
Potential Emission in tons/yr	0.0	0.0	0.0	0.1	0.0	0.1

\*PM emission factor is filterable PM only. PM10 emission factor is condensable and filterable PM10 combined.

\*\*Emission Factors for NO<sub>x</sub>: Uncontrolled = 100, Low NO<sub>x</sub> Burner = 50, Low NO<sub>x</sub> Burners/Flue gas recirculation = 32

**Methodology**

All Emission factors are based on normal firing.

MMBTu = 1,000,000 Btu

MMCF - 1,000,000 Cubic Feet of Gas

Potential Throughput (MMCF) = Heat Input Capacity (MMBTu/hr) x 8,760 hrs/yr x 1 MMCF/1,000 MMBtu

Emission Factors from AP-42, Chapter 1.4, Tables 1.4-1, 1.4-2, and 1.4-3, SCC #1-02-006-02, 1-01-006-02, 1-03-006-02, and 1-03-006-03 (AP-42 Supplement D 3/98)

Emission (tons/yr) = Throughput (MMCF/yr) x Emission Factor (lb/MMCF)/2,000 lb/ton

See next page for HAPs emissions calculations.

**Appendix A: Emission Calculations**  
**Natural Gas Combustion Only**  
**MMBTU/HR<100**  
**Reznor**

**Company Name:** Cardinal IG  
**Address City IN Zip:** 301 East McSwain Drive, Fremont, IN 46737  
**CP:** 151-14740  
**Plt ID:** 151-00056  
**Reviewer:** ERG/AR  
**Date:** 4-Sep-01

HAPs - Organics

Emission Factor in lb/MMCF	Benzene 2.1E-03	Dichlorobenzene 1.2E-03	Formaldehyde 7.5E-02	Hexane 1.8E+00	Toluene 3.4E-03
Potential Emission in tons/yr	1.380E-06	7.884E-07	4.928E-05	1.183E-03	2.234E-06

HAPs - Metals

Emission Factor in lb/MMCF	Lead 5.0E-04	Cadmium 1.1E-03	Chromium 1.4E-03	Manganese 3.8E-04	Nickel 2.1E-03
Potential Emission in tons/yr	3.285E-07	7.227E-07	9.198E-07	2.497E-07	1.380E-06

Methodology is the same as previous page.

Total HAPs = 1.240E-03 tons/yr

The five highest organic and metal HAPs emission factors are provided above.  
Additional HAPs emission factors are available in AP-42, Chapter 1.4.

**Appendix A: Emission Calculations**  
**Natural Gas Combustion Only**  
**MMBTU/HR<100**  
**Tempering Oven**

**Company Name:** Cardinal IG  
**Address City IN Zip:** 301 East McSwain Drive, Fremont, IN 46737  
**CP:** 151-14740  
**Pit ID:** 151-00056  
**Reviewer:** ERG/AR  
**Date:** 4-Sep-01

Heat Input Capacity  
MMBtu/hr

Potential Throughput  
MMCF/yr

8.0

70.1

Pollutant						
	PM*	PM10*	SO2	NO <sub>x</sub>	VOC	CO
Emission Factor in lb/MMCF	7.6	7.6	0.6	100.0 **see below	5.5	84.0
Potential Emission in tons/yr	0.3	0.3	0.0	3.5	0.2	2.9

\*PM emission factor is filterable PM only. PM10 emission factor is condensable and filterable PM10 combined.

\*\*Emission Factors for NO<sub>x</sub>: Uncontrolled = 100, Low NO<sub>x</sub> Burner = 50, Low NO<sub>x</sub> Burners/Flue gas recirculation = 32

### Methodology

All Emission factors are based on normal firing.

MMBtu = 1,000,000 Btu

MMCF - 1,000,000 Cubic Feet of Gas

Potential Throughput (MMCF) = Heat Input Capacity (MMBtu/hr) x 8,760 hrs/yr x 1 MMCF/1,000 MMBtu

Emission Factors from AP-42, Chapter 1.4, Tables 1.4-1, 1.4-2, and 1.4-3, SCC #1-02-006-02, 1-01-006-02, 1-03-006-02, and 1-03-006-03 (AP-42 Supplement D 3/98)

Emission (tons/yr) = Throughput (MMCF/yr) x Emission Factor (lb/MMCF)/2,000 lb/ton

See next page for HAPs emissions calculations.

**Appendix A: Emission Calculations**  
**Natural Gas Combustion Only**  
**MMBTU/HR<100**  
**Tempering Oven**

**Company Name:** Cardinal IG  
**Address City IN Zip:** 301 East McSwain Drive, Fremont, IN 46737  
**CP:** 151-14740  
**Plt ID:** 151-00056  
**Reviewer:** ERG/AR  
**Date:** 4-Sep-01

HAPs - Organics

Emission Factor in lb/MMCF	Benzene 2.1E-03	Dichlorobenzene 1.2E-03	Formaldehyde 7.5E-02	Hexane 1.8E+00	Toluene 3.4E-03
Potential Emission in tons/yr	7.358E-05	4.205E-05	2.628E-03	6.307E-02	1.191E-04

HAPs - Metals

Emission Factor in lb/MMCF	Lead 5.0E-04	Cadmium 1.1E-03	Chromium 1.4E-03	Manganese 3.8E-04	Nickel 2.1E-03
Potential Emission in tons/yr	1.752E-05	3.854E-05	4.906E-05	1.332E-05	7.358E-05

Total HAPs = 6.613E-02 tons/yr

Methodology is the same as previous page.

The five highest organic and metal HAPs emission factors are provided above.  
 Additional HAPs emission factors are available in AP-42, Chapter 1.4.

**Appendix A: Emission Calculations**  
**Natural Gas Combustion Only**  
**MMBTU/HR<100**  
**Space Heaters**

**Company Name:** Cardinal IG  
**Address City IN Zip:** 301 East McSwain Drive, Fremont, IN 46737  
**CP:** 151-14740  
**Pit ID:** 151-00056  
**Reviewer:** ERG/AR  
**Date:** 4-Sep-01

Heat Input Capacity  
MMBtu/hr

Potential Throughput  
MMCF/yr

2.3

20.1

Emission Factor in lb/MMCF	Pollutant					
	PM*	PM10*	SO2	NO <sub>x</sub>	VOC	CO
	7.6	7.6	0.6	100.0	5.5	84.0
				**see below		
Potential Emission in tons/yr	0.1	0.1	0.0	1.0	0.1	0.8

\*PM emission factor is filterable PM only. PM10 emission factor is condensable and filterable PM10 combined.

\*\*Emission Factors for NO<sub>x</sub>: Uncontrolled = 100, Low NO<sub>x</sub> Burner = 50, Low NO<sub>x</sub> Burners/Flue gas recirculation = 32

**Methodology**

All Emission factors are based on normal firing.  
MMBtu = 1,000,000 Btu  
MMCF - 1,000,000 Cubic Feet of Gas

Potential Throughput (MMCF) = Heat Input Capacity (MMBtu/hr) x 8,760 hrs/yr x 1 MMCF/1,000 MMBtu  
Emission Factors from AP-42, Chapter 1.4, Tables 1.4-1, 1.4-2, and 1.4-3, SCC #1-02-006-02, 1-01-006-02, 1-03-006-02, and 1-03-006-03 (AP-42 Supplement D 3/98)  
Emission (tons/yr) = Throughput (MMCF/yr) x Emission Factor (lb/MMCF)/2,000 lb/ton

See next page for HAPs emissions calculations.

**Appendix A: Emission Calculations**  
**Natural Gas Combustion Only**  
**MMBTU/HR<100**  
**Space Heaters**

**Company Name:** Cardinal IG  
**Address City IN Zip:** 301 East McSwain Drive, Fremont, IN 46737  
**CP:** 151-14740  
**Pit ID:** 151-00056  
**Reviewer:** ERG/AR  
**Date:** 4-Sep-01

HAPs - Organics

Emission Factor in lb/MMCF	Benzene 2.1E-03	Dichlorobenzene 1.2E-03	Formaldehyde 7.5E-02	Hexane 1.8E+00	Toluene 3.4E-03
Potential Emission in tons/yr	2.106E-05	1.204E-05	7.523E-04	1.805E-02	3.410E-05

HAPs - Metals

Emission Factor in lb/MMCF	Lead 5.0E-04	Cadmuim 1.1E-03	Chromium 1.4E-03	Manganese 3.8E-04	Nickel 2.1E-03
Potential Emission in tons/yr	5.015E-06	1.103E-05	1.404E-05	3.811E-06	2.106E-05

Total HAPs = 1.893E-02 tons/yr

Methodology is the same as previous page.

The five highest organic and metal HAPs emission factors are provided above.  
Additional HAPs emission factors are available in AP-42, Chapter 1.4.

### VOC and Particulate

Page 9 of 10 TSD App A

**Company Name:** Cardinal IG

**Address City IN Zip:** 301 East McSwain Drive, Fremont, IN 46737

**CP:** 151-14740

Plt ID: 151-00056

**Reviewer:** ERG/AR

**Date:** 4-Sep-01

Material	Density (Lb/Gal)	Weight % Volatile (H2O & Organics)	Weight % Water	Weight % Organics	Volume % Water	Volume % Non-Volatiles (solids)	Gal of Mat. (gal/unit)	Maximum (unit/hour)	Pounds VOC per gallon of coating less water	Pounds VOC per gallon of coating	Potential VOC pounds per hour	Potential VOC pounds per day	Potential VOC tons per year	Particulate Potential (ton/yr)	lb VOC/gal solids	Transfer Efficiency
PB-1	6.3	41.24%	0.0%	41.2%	0.0%	7.23%	0.00110	200.000	2.59	2.59	0.57	13.68	2.50	2.49	35.85	30%
PB-2	6.6	100.00%	0.0%	100.0%	0.0%	0.00%	0.00016	200.000	6.64	6.64	0.21	5.10	0.93	0.00	#DIV/0!	30%
Alcohol Muttin	6.6	100.00%	0.0%	100.0%	0.0%	0.00%	0.00083	400.000	6.60	6.60	2.19	52.59	9.60	0.00	#DIV/0!	100%
Alcohol Punch	6.6	100.00%	0.0%	100.0%	0.0%	0.00%	0.00063	400.000	6.60	6.60	1.66	39.92	7.28	0.00	#DIV/0!	100%
Alcohol Extrusion	6.6	100.00%	0.0%	100.0%	0.0%	0.00%	0.00016	400.000	6.60	6.60	0.42	10.14	1.85	0.00	#DIV/0!	100%
Alcohol Cleaning	6.6	100.00%	0.0%	100.0%	0.0%	0.00%	0.00016	400.000	6.60	6.60	0.42	10.14	1.85	0.00	#DIV/0!	100%

### State Potential Emissions

**Add worst case coating to all solvents**

5.48

131.56

24.01

2.49

## METHODOLOGY

Pounds of VOC per Gallon Coating less Water = (Density (lb/gal) \* Weight % Organics) / (1-Volume % water)

Pounds of VOC per Gallon Coating = (Density (lb/gal) \* Weight % Organics)

Potential VOC Pounds per Hour = Pounds of VOC per Gallon coating (lb/gal) \* Gal of Material (gal/unit) \* Maximum (units/hr)

Potential VOC Pounds per Day = Pounds of VOC per Gallon coating (lb/gal) \* Gal of Material (gal/unit) \* Maximum (units/hr) \* (24 hr/day)

Potential VOC Tons per Year = Pounds of VOC per Gallon coating (lb/gal) \* Gal of Material (gal/unit) \* Maximum (units/hr) \* (8760 hr/yr) \* (1 ton/2000 lbs)

$$\text{Particulate Potential Tons per Year} = (\text{units/hour}) * (\text{gal/unit}) * (\text{lbs/gal}) * (1 - \text{Weight \% Volatiles}) * (1 - \text{Transfer efficiency}) * (8760 \text{ hrs/yr}) * (1 \text{ ton}/2000 \text{ lbs})$$
$$\text{Pounds VOC per Gallon of Solids} = (\text{Density (lbs/gal)} * \text{Weight \% organics}) / (\text{Volume \% solids})$$

Total = Worst Coating + Sum of all solvents used

surcoat.wk4 9/95

**Appendix A: Emission Calculations**  
**Summary Table of Emissions in Tons/Year**

**Company Name:** Cardinal IG  
**Address City IN Zip:** 301 East McSwain Drive, Fremont, IN 46737  
**CP:** 151-14740  
**Plt ID:** 151-00056  
**Reviewer:** ERG/AR  
**Date:** 4-Sep-01

	Tons/Year						
	<b>PM</b>	<b>PM10</b>	<b>SO2</b>	<b>Nox</b>	<b>VOC</b>	<b>CO</b>	<b>HAPs</b>
Surface Coating	2.49	2.49	0	0	24.01	0	0
Space Heating	0.08	0.08	0.01	1.00	0.06	0.84	0.02
Tempering Oven	0.27	0.27	0.02	3.50	0.19	2.94	0.07
Reznor	0.00	0.00	0.00	0.07	0.00	0.06	0.00
Thermocyclers	0.03	0.03	0.00	0.42	0.02	0.35	0.01
<b>Total</b>	<b>2.87</b>	<b>2.87</b>	<b>0.03</b>	<b>4.99</b>	<b>24.28</b>	<b>4.19</b>	<b>0.09</b>